

## 113 AIRFIELD PAVEMENTS - APRONS (Includes aircraft parking and access aprons)

### 113 20 AIRCRAFT PARKING APRON (SY)

Description. Aircraft parking aprons are required for loading, unloading and servicing of aircraft in addition to providing parking space. There is no standard size or apron configuration. The size is based on the type and number of aircraft to be parked, the requirement for squadron integrity and 45 versus 90 degree parking. The area required includes: parking space, wing-tip separation between aircraft, interior taxilanes and peripheral taxilanes. Aprons used for ordnance handling require special siting considerations, see category codes 116 55 and 116 56. For design criteria, see NAVFAC DM 21 series design manuals.

Criteria. In some cases, these criteria will refer to standards for aprons supporting class A or B aircraft. See introduction to the 111 category codes for explanation of class A and B. The determination of the apron requirement involves the following steps:

- 1) Determine the number of aircraft parking spaces required.
- 2) Layout the parking spaces using the dimensions given herein for clearances between aircraft and interior taxilanes.
- 3) Provide peripheral taxiways around the perimeter of the apron.

1. Number of Parking Spaces. The number of parking spaces required is based on the average number of aircraft on-board (including transients) reduced by a factor to reflect the number of aircraft expected to be in hangars for scheduled organizational maintenance. For planning purposes, assume that the following percentages of the average on-board aircraft assigned organizational maintenance at a station will be in the hangar for scheduled maintenance:

20%	- Single engine carrier aircraft (include single engine helicopters)
25%	- Twin engine carrier aircraft (include twin and three engine helicopters)
8 %	- Patrol, early warning and training aircraft (or training versions of fleet aircraft)
No reduction	- Reduction not required for aircraft not indicated above such as transport aircraft.

Where organizational maintenance is provided by a commercial contractor, the average number of aircraft in hangars for scheduled maintenance shall be determined on an individual basis. The above reductions apply except that the reduction to the number of apron parking spaces shall not exceed 50 percent of the hangar spaces available. For example, if the reduction in apron size is computed to be 50 spaces but the hangars can only provide space for 80 aircraft, the apron reduction should be reduced to 50 percent of 80, or 40 parking spaces. Where an air installation is subject to peak loadings on a regular basis for training exercises or overlap of deployable squadrons, individual justification may be provided for additional

spaces to support peak loadings.

2. Spacing of aircraft. The following Tables and Figures provide dimensions for apron spacing and typical apron configurations:

Figure 113 20A - 90 Degree Aircraft Parking Configuration  
Figure 113 20B - 45 Degree Aircraft Parking Configuration  
Table 113 20A - Aircraft Spacing  
Table 113 208 - Aircraft Parking Areas - Approximation  
Figure 113 20C - Typical Aircraft Parking Apron  
Figure 113 20D - Aircraft Parking Apron - (Fixed Wing Aircraft)  
(Minimal Through Traffic)  
Figure 113 20E - Minimum Peripheral Taxilane (Fixed Wing Aircraft)

Parked aircraft must be separated to maintain proper wing-tip clearances, interior taxilane widths and protection from jet blast. The most efficient apron size results from parking jet aircraft at a 45 degree angle and propeller aircraft and helicopters at a 90 degree angle to the interior taxilane. Use of the most efficient configuration is mandatory; in case of deviations, the planner must provide full justification. See Figures 113 20A and 113 20B for the 45 and 90 degree configurations and the description of the A, B, C, D and E dimensions used for apron spacing. Table 113 20A provides the spacing dimensions which shall be used for Basic Facility Requirements determination. For rough estimates of apron requirements, Table 113 20B provides approximate square yards of apron space by aircraft type.

The apron spacing dimensions may be modified when a Fixed Point Utility System (FPUS), starting air and electrical service, is to be installed in the apron. The FPUS service points and the parking spaces are spaced to accommodate all Navy fighter and attack aircraft rather than designed for a particular aircraft. Aprons with FPUS may be planned using an "A + D" dimension of 145 feet and a "C" dimension of 71 feet, assumes 45 degree parking. For aprons which are expected to support S-3 aircraft, the "A + D" may be increased to 150 feet.

3. Peripheral Taxilanes. A peripheral taxilane is normally provided on all sides of a parking apron. The standard width is 150 feet except for those aprons which support only helicopters and no future requirement to support fixed wing aircraft can be identified. In this case the width shall be computed as:

$$\text{Width} = 1.5 \times (\text{Rotor Diameter}) + 20 \text{ Ft.}$$

Use the largest rotor diameter of those helicopters expected to use the apron. This width provides a 40 foot taxilane with a one rotor diameter clearance between taxiing and parking helicopters.

4. Safety/Lateral Clearances. See NAVFAC P-80.3 for the definition and application of airfield safety clearances. Parking aprons shall be sited outside the primary surface of the runway (or helipad). The edge of the apron may be adjacent to the outer edge of the primary surface, however, parked aircraft shall not penetrate the transitional surface.

Aircraft taxiing on the peripheral taxilane are not considered obstructions even though they do penetrate the transitional surface. The apron

edge shall be a minimum of 150 feet from the centerline of any parallel taxiway of the runway system. The minimum distance any object, except maintenance hangars, shall be sited from the apron edge is:

Aprons, class "A" aircraft	75 Ft.	
Aprons, class "B" aircraft	100 Ft.	
Aprons, Helicopters	75 Ft.,	increase to 100 feet where the CH-53 is assigned to an apron

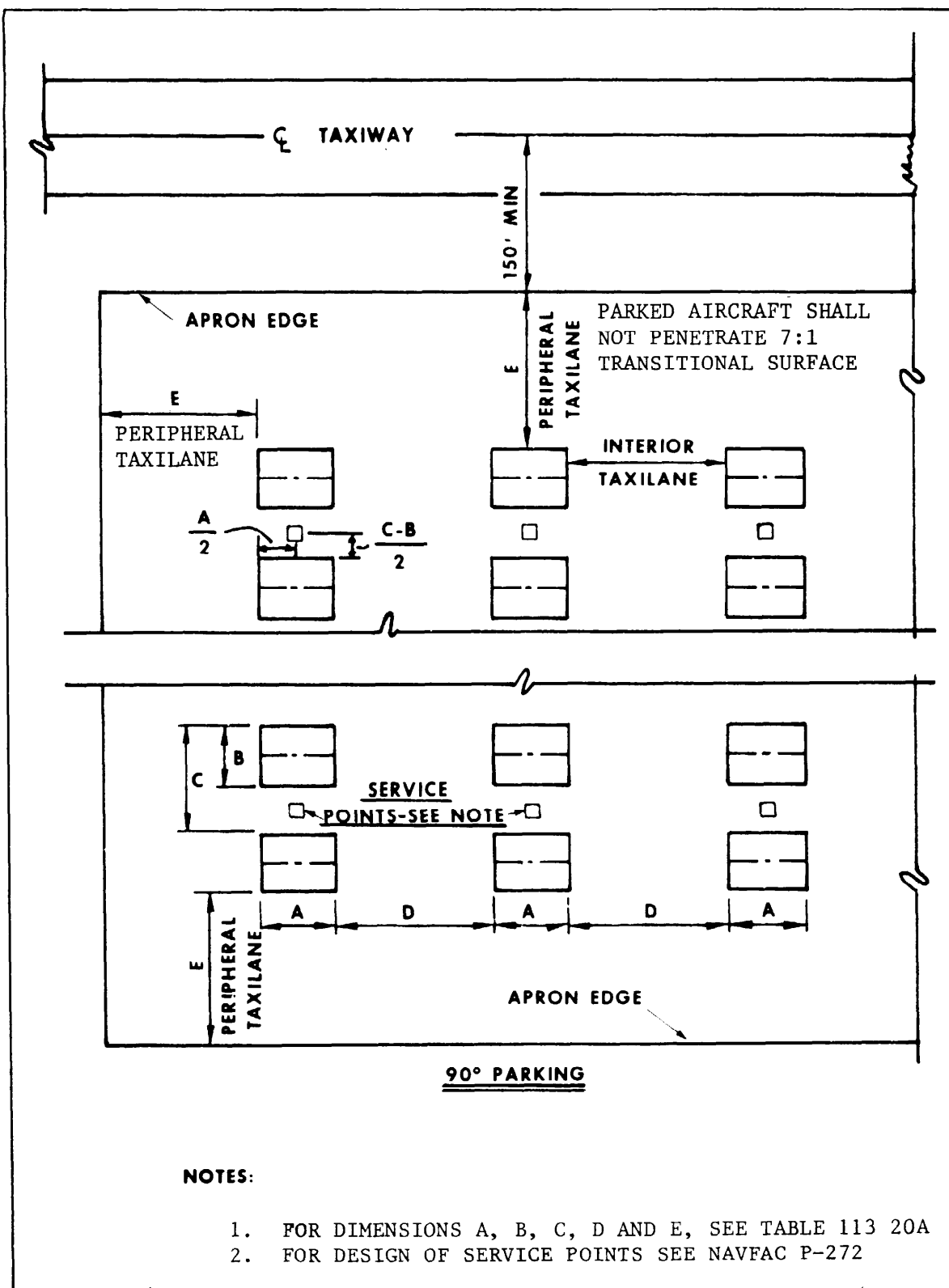
Maintenance hangars opening to the apron shall be offset 50 feet from the apron edge. The 50 foot access pavement to the hangar is coded as 113 40.

Deviation From Criteria: The 150 foot separation between a parking apron and the centerline of a through taxiway must be maintained when the taxiway is expected to carry a substantial amount of through traffic; i.e., traffic other than that which starts or terminates at that particular apron. When the anticipated amount of through traffic is minimal and is so justified to NAVAIR, a parking apron may be located such that the through taxiway is incorporated within the apron peripheral taxilane, see Figure 113 20D. However, in this case, the through taxiway becomes a part of the apron and therefore must be located outside the runway primary surface. Any savings in pavement to be gained by combining taxiways shall be compared to any increases in pavement for runway turnoffs required due to moving the parallel taxiway outside the runway primary surface. Combined taxiways shall not be planned without prior approval of NAVAIR.

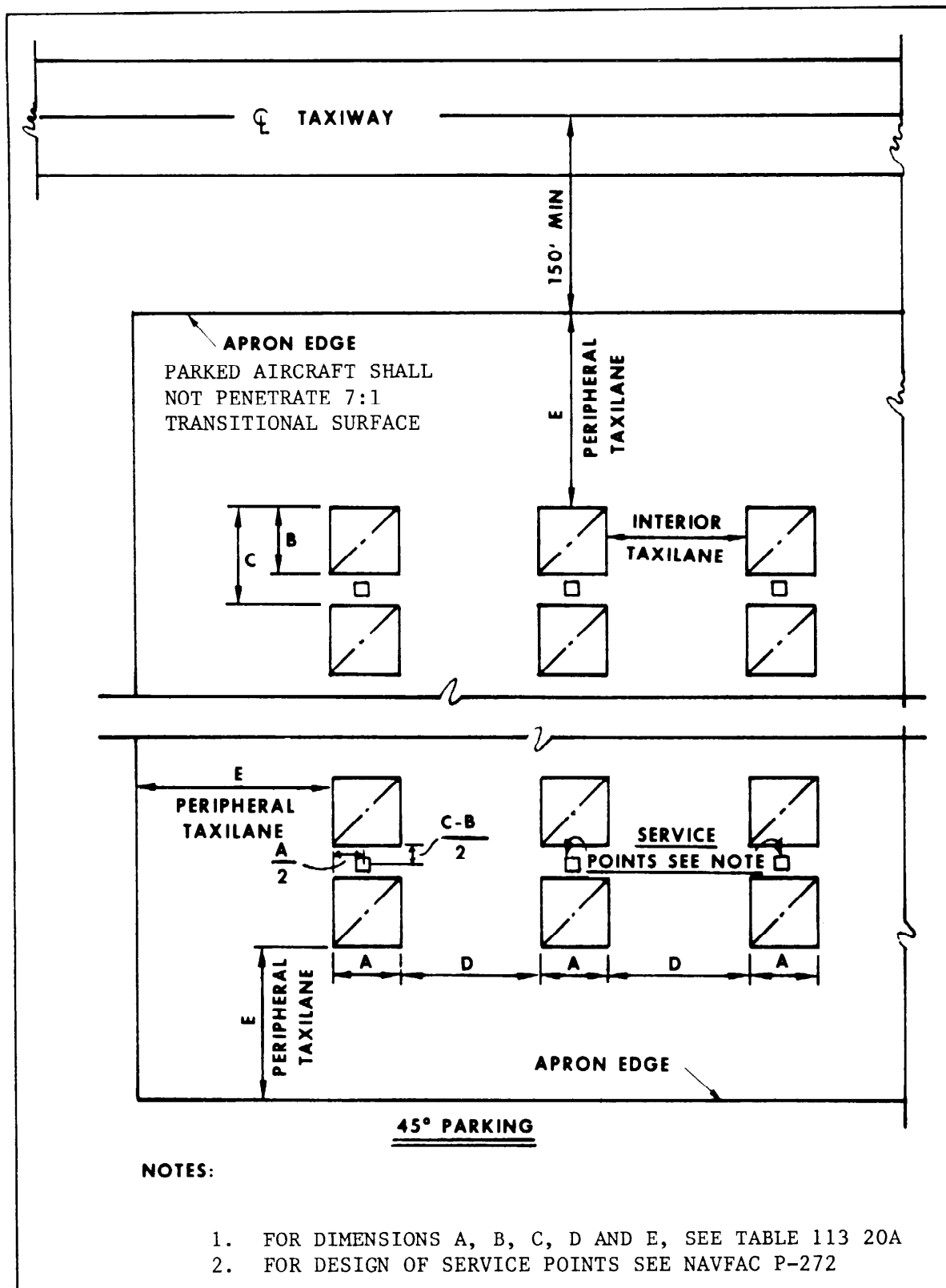
Figure 113 20C indicates that 150 foot wide peripheral taxilanes are to be provided on all sides of fixed wing aircraft parking aprons. Although such an arrangement is desirable, it is not always necessary. When small numbers of aircraft (one or two rows) are to be parked or when operational requirements allow, the number and/or width of the peripheral taxilanes may be reduced on the advice of local air operations personnel, subject to NAVAIR approval. See Figures 113 20C/D which indicate which fixed wing aircraft peripheral taxilanes may be reduced. The 150 foot wide taxilane is designed to accommodate two carrier type aircraft when passing and therefore could be reduced in width if the level of apron operations only require one aircraft to be on the taxilane at a time. In this case, the taxilane shall be sized to accommodate the largest aircraft to be parked on the apron. See Figure 113 20E which provides a sketch of the minimum taxilane clearances. Peripheral taxilanes for helicopters shall not be reduced from the dimensions shown in Table 113 20A.

### **113 40 AIRCRAFT ACCESS APRON (SY)**

This apron provides access to aircraft maintenance hangars and is normally programmed at the same time as the hangar (Category Code 211 05). The paved area required varies with the hangar dimensions and the hangars displacement from the parking apron. The access apron requires a minimum 50-foot depth and must be at least as long as the hangar door width. See NAVFAC DM-21.1 for design criteria.



**FIGURE 113-20A**  
Aircraft Parking Configuration



Aircraft Parking Configuration

FIGURE 113-20B

**TABLE 113-20A**  
**Parking Apron Spacing**  
**Jet Aircraft- 45 Degree Parking**

<b>Aircraft Designation</b>	<b>Wingspan</b>		<b>Length</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
	<b>(Ft)</b>	<b>(In)</b>	<b>(Ft)</b>	<b>(In)</b>	<b>(Ft)</b>	<b>(Ft)</b>	<b>(Ft)</b>	<b>(Ft)</b>	<b>(Ft)</b>
F-4	38	5	58	3	47	47	70	90	150
F-5E	28	0	48	3	*	*	*	*	150
F-5F	28	0	51	8	*	*	*	*	150
F-14	65	0	62	0	56	56	106	95	150
F-14#	38	3	62	0	55	55	70	90	150
F-14A+/F-14D	65	0	62	0	56	56	106	135	150
F-16	31	0	49	4	*	*	*	*	150
F/A-18	40	5	56	0	47	47	71	90	150
A-4	27	6	39	5	31	31	53	90	150
A-6	53	0	55	6	47	47	96	90	150
A-7	38	9	46	0	39	39	71	90	150
AV-8A	25	0	45	0	32	32	57	90	150
AV-8B	30	4	46	4	36	36	57	90	150
S-3	68	8	53	3	51	51	114	99	150
C-5	222	9	245	11	199	199	350	273	150
C-9	93	4	119	4	97	97	160	133	150
KC-135	130	10	136	3	130	130	220	181	150
C-141B	160	9	168	4	*	*	*	*	150
T-2	37	11	38	9	40	40	68	90	150
T-39	44	5	44	6	38	38	78	90	150
T-45	30	10	39	3	*	*	*	*	150
<b># Wings Swept</b> <b>* Contact COMNAVAIRSYSCOM for guidance</b>									

**TABLE 113-20A**  
**Parking Apron Spacing**  
**Jet Aircraft - 90 Degree Parking**

<b>Aircraft Designation</b>	<b>Wingspan</b>		<b>Length</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
	<b>(Ft)</b>	<b>(In)</b>	<b>(Ft)</b>	<b>(In)</b>	<b>(Ft)</b>	<b>(Ft)</b>	<b>(Ft)</b>	<b>(Ft)</b>	<b>(Ft)</b>
F-4	38	5	58	3	58	38	48	115	150
F-5E	28	0	48	3	48	28	38	100	150
F-5F	28	0	51	8	52	28	38	100	150
F-14	65	0	62	0	62	65	80	125	150
F-14#	38	3	62	0	62	38	48	125	150
F-14A+/F-14D	65	0	62	0	62	65	80	135	150
F-16	31	0	49	4	49	31	41	100	150
F/A-18	40	5	56	0	56	40	50	115	150
A-4	27	6	39	5	39	28	38	125	150
A-6	53	0	55	6	56	53	68	105	150
A-7	38	9	46	0	46	39	49	125	150
AV-8A	25	0	45	0	45	25	35	100	150
AV-80	30	4	46	4	46	30	40	100	150
S-3	68	8	53	3	53	69	84	125	150
C-5	222	9	245	11	246	223	248	273	150
C-9	93	4	119	4	119	93	113	133	150
KC-135	130	10	136	3	136	131	156	181	150
C-141B	160	9	168	4	168	161	186	211	150
T-2	37	11	38	9	39	38	48	110	150
T-39	44	5	44	6	45	44	54	115	150
T-45	30	10	39	3	39	31	41	100	150
<b># Wings Swept</b>									

**TABLE 113-20A**  
**Parking Apron Spacing**  
 Propeller Aircraft - 90 Degree Parking

Aircraft Designation	Wingspan (Ft) (In)	Length (Ft) (In)	A (Ft)	B (Ft)	C (Ft)	D (Ft)	E (Ft)
A-1	50-0	39-2	39	50	65	90	150
E-1	72-4	45-4	45	72	87	102	150
E-2	80-7	56-4	56	81	101	121	150
P-2	104-0	93-0	93	104	129	154	150
P-3	99-8	116-10	117	100	120	150	150
S-2	72-7	43-6	44	73	88	103	150
OV-10	40-0	41-7	42	40	50	90	150
OV-12	40-0	41-7	42	40	50	90	150
UC-12B	54-6	43-9	44	55	70	90	150
C-1	69-8	42-0	44	73	88	103	150
C-2	80-7	56-8	57	81	101	121	150
RC-45	47-8	34-2	34	48	58	90	150
C-117	90-0	67-9	68	90	110	130	150
C-118	117-6	107-0	107	118	143	168	150
C-121	123-0	116-2	116	123	148	173	150
KC-130	132-7	97-10	98	133	158	183	150
C-131	105-4	79-3	79	105	130	155	150
T-28	40-7	34-6	35	41	51	90	150
T-34	33-4	28-9	29	33	43	90	150
T-44	50-3	35-6	36	50	65	90	150



**TABLE 113-20A**  
**Parking Apron Spacing**  
Helicopters - 90 Degree Parking

Aircraft Designation	Wingspan (Ft) (In)	Length (Ft) (In)	A (Ft)	B (Ft)	C (Ft)	D (Ft)	E <sup>(1)</sup> (Ft)
UH-1	44-0	53-0	53	44	66	110	86
AH-1	44-0	53-1	53	44	66	110	86
UH-2	44-0	52-2	52	44	66	110	86
SH-3	62-0	72-6	73	62	93	124	113
UH-34	56-0	65-9	66	56	84	112	104
OH-43	50-6	47-0	47	51	76	101	96
UH-46	50-0	84-4	84	50	75	100	95
OH-50	20-0	20-0	20	20	30	50	50
CH-53D	72-3	88-3	88	72	108	144	128
CH-53E	79-0	99-0	99	79	119	158	139
CH-54	72-0	88-6	89	72	108	144	128
TH-57	33-4	38-10	39	33	50	84	70
SH-60B	53-8	64-10	65	54	81	108	101

Note (1) - The "E" dimension for helicopters is equal to 1.5 x (Rotor Diameter) plus 20 Ft.

$$E = 1.5R + 20$$

**TABLE 113-20B**  
**Aircraft Parking Apron - Approximation**

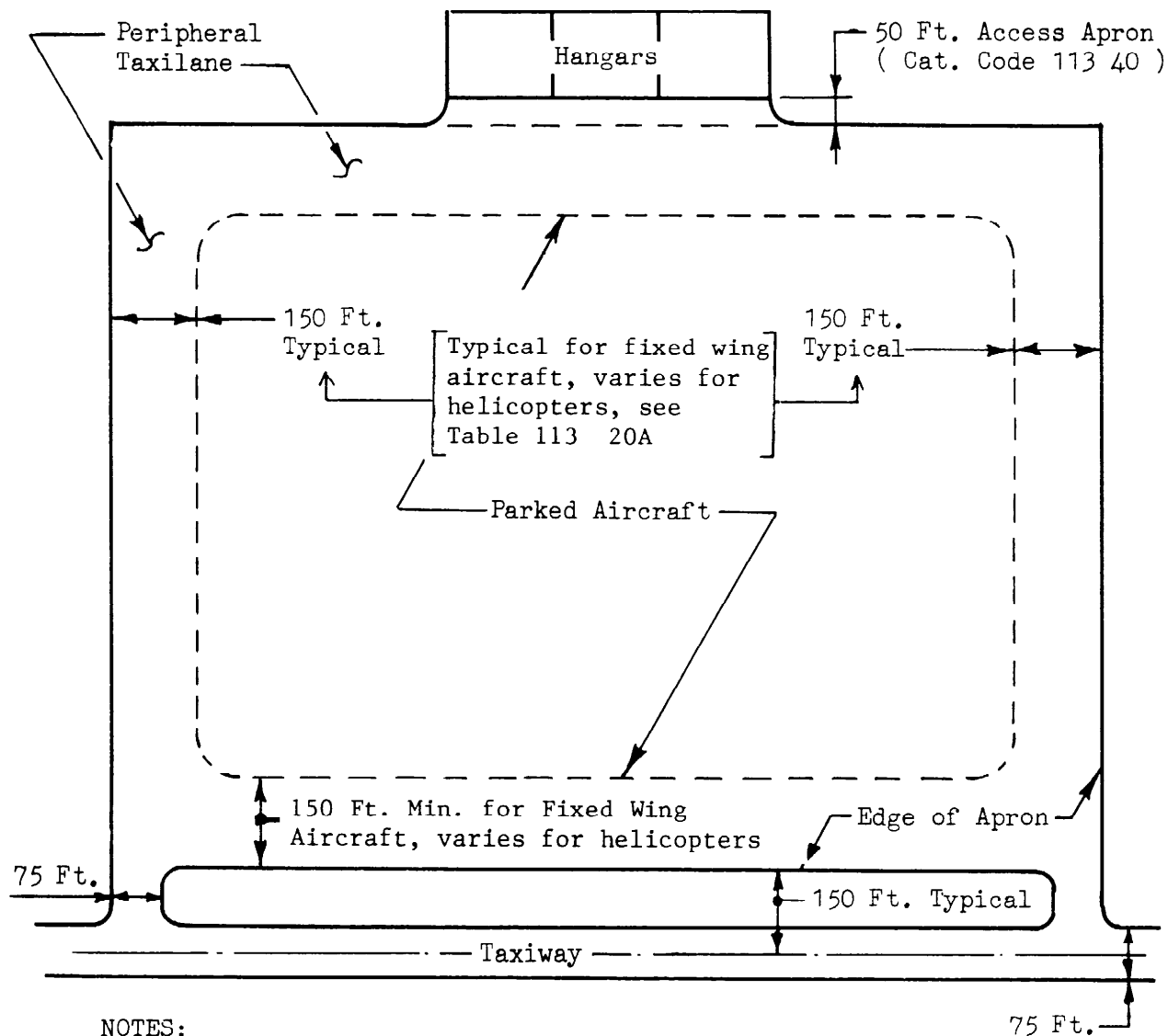
Propeller Aircraft			Helicopters	
Aircraft Type	Sy. Yds. Per* Aircraft (90° Parking)		Helicopter Type	Sy. Yds. Per* Helicopter (90° Parking)
A-1	935	Continued on next page, see notes following the table.	UH-1	1195
E-1	1420		AH-1	1195
E-2	1985		UH-2	1190
P-2	3540		SH-3	2036
P-3	3560		UH-34	1661
S-2	1440		OH-43	1250
OV-10	735		UH-46	1533
OV-12	735		OH-50	230
UC-12B	1040		CH-53D	2784
C-1	1425		CH-53E	3398
C-2	2000		CH-54	2796
RC-45	800		TH-57	685
C-117	2420		SH-60B	1557
C-118	4375			
C-121	4750			
KC-130	4940			
C-131	3380			
T-28	710			
T-34	570			
T-44	910			

**TABLE 113-20B**  
**Aircraft Parking Apron - Approximation**

Jet Aircraft		
Aircraft Type	Sy. Yds. Per Aircraft*	
	45° Parking	90° Parking
F-4	1065	1860
F-8	1110	1880
F-14	1778	2310
F-14**	1128	2310
F/A-18	1080	1920
A-3	2300	2540
A-4	715	1675
PA-5	1640	2360
A-6	1460	1700
A-7	1020	1870
AV-8A	775	1275
AV-8B	800	1280
S-3	1900	2170
C-5	18350	14300
C-9	4090	3165
KC-135	7580	5500
C-141A	9680	7350
T-2	985	1490
T-39	1110	1780

\* The parking area listed overlaps but does not include the entire peripheral taxilane. For planning purposes, compute the area of a peripheral taxilane around the entire apron and add 75% of the computed value to the area obtained from the table.

\*\* Wings swept.

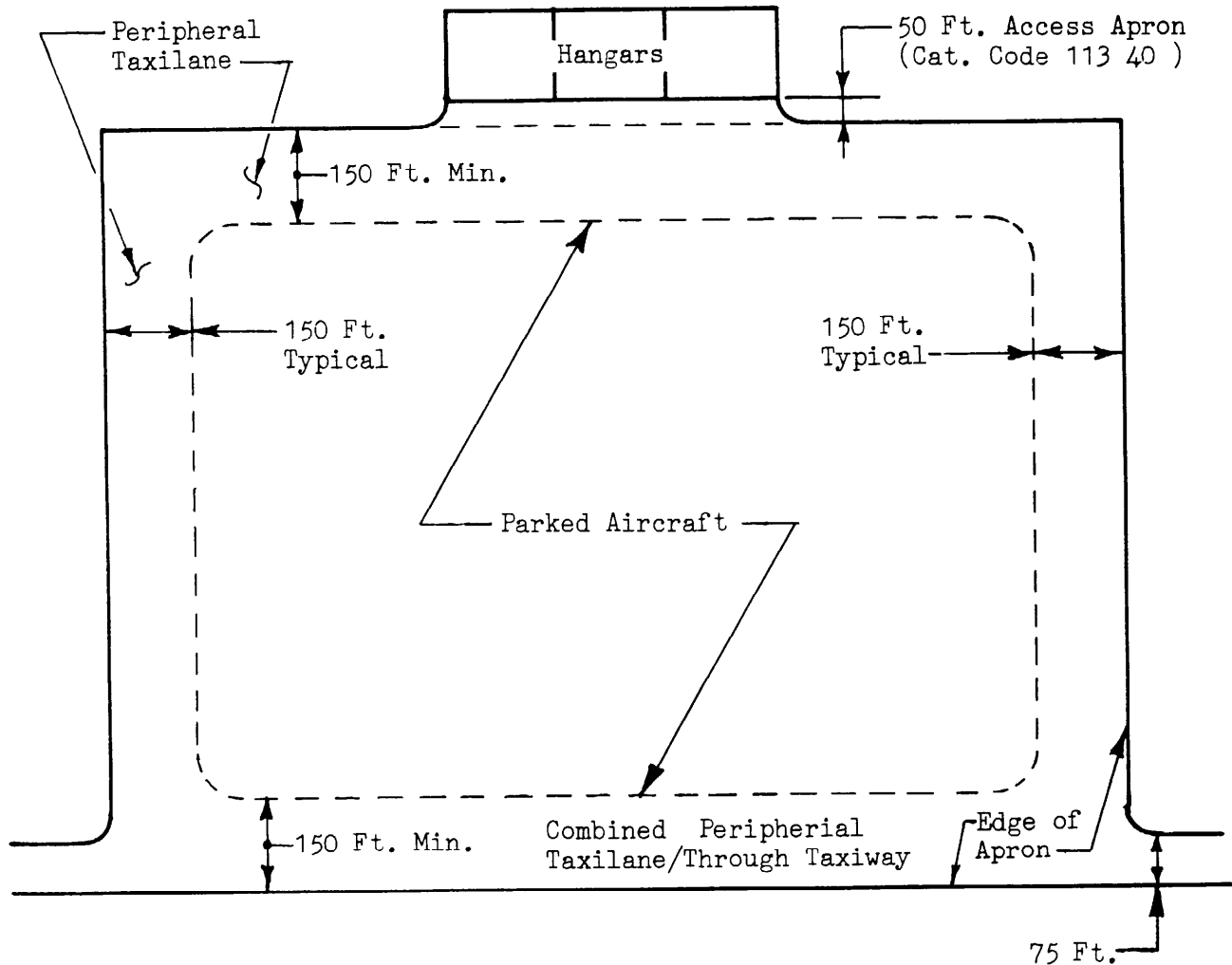


NOTES:

Dimensions marked "Typical" may be reduced under certain operating conditions. See paragraph titled "Deviations From Criteria".

The edge of the apron must be outside the Runway Primary Surface, parked aircraft shall not penetrate the 7:1 Transitional Surface.

**FIGURE 113 20C**  
**TYPICAL AIRCRAFT PARKING APRON**  
 (NORMAL THROUGH TRAFFIC)

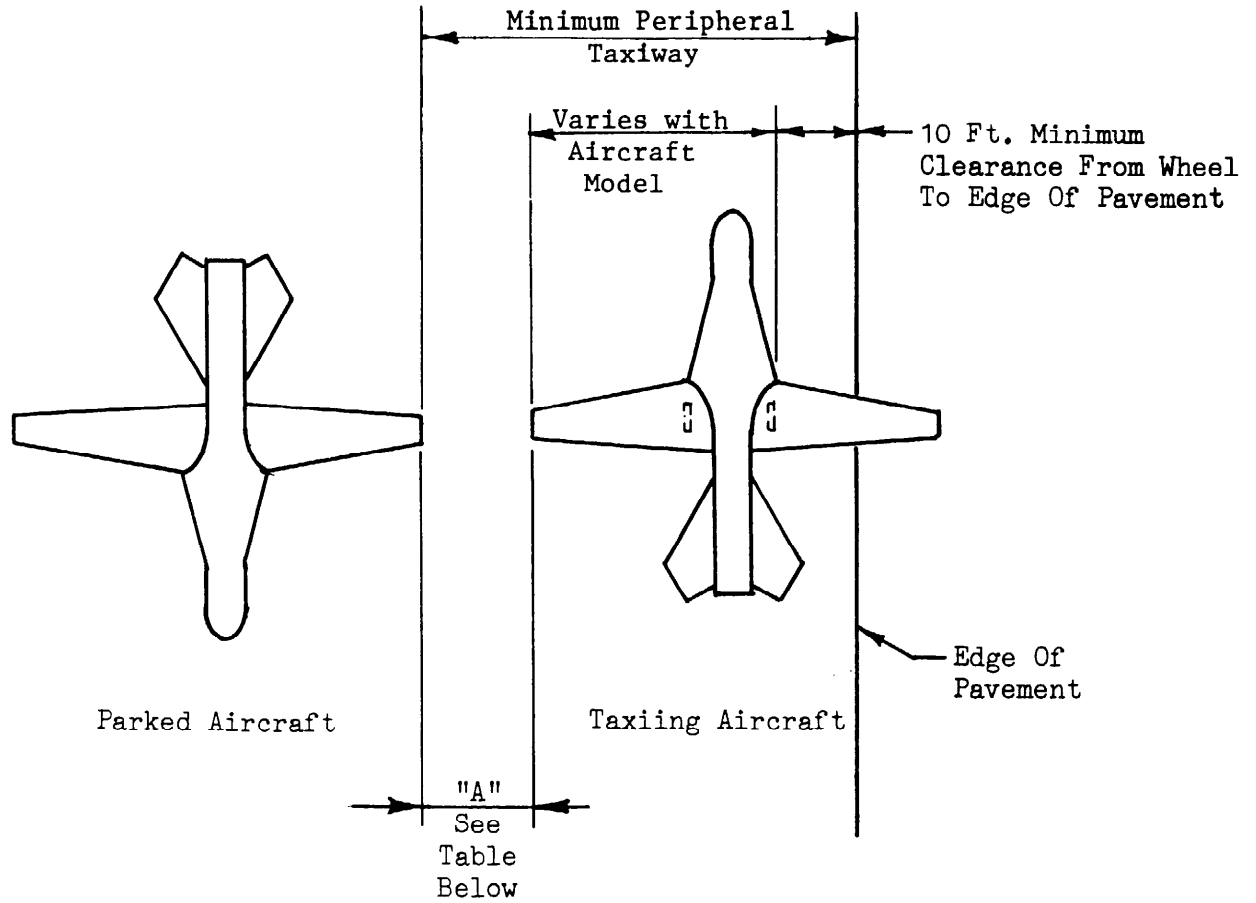


NOTES:

Dimensions marked "Typical" may be reduced under certain operating conditions. See paragraph titled "Deviations From Criteria".

The edge of the apron must be outside the Runway Primary Surface, parked aircraft shall not penetrate the 7:1 Transitional Surface.

**FIGURE 113 20D**  
**AIRCRAFT PARKING APRON-FIXED WING AIRCRAFT**  
(MINIMAL THROUGH TRAFFIC)



Wingspan Of Taxiing Aircraft	"A" Min. Wingtip Clearance
Over 100 Ft.	25 Ft.
75 To 100 Ft.	23 Ft.
50 To 74 Ft.	15 Ft.
Less Than 50 Ft.	10 Ft.

**FIGURE 113 20E**  
**MINIMUM PERIPHERAL TAXILANE**  
 (FIXED WING AIRCRAFT)